1: Warner E-5 (1926-1929)1937
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283 of the red-breasted parrot can be used for certain totemic emblems.
237 To collect a sufficient supply of red feathers to put on such totems as
431 their fire, woman and other Dua moiety totemic emblems demands considerable industry not only on the part of the totem makers in their daily hunting and robbings of birds' nests but also in gift exchanges. This means that red ocher and other body paints, spear heads from the interior, carved wooden spears from the coastal belt, and other objects of economic value must be had to trade. Small white feathers from hawks' breasts and from the sulphur-crested cockatoo and the blue-eyed corella are also used for the string of many totems. The larger feathers of the cockatoos and the yellow crest of the sulphur-crested cockatoo are used for the great ritual headdresses made by the
[314] men with the aid of adhesive gathered from the ironwood tree and the honeybee's hive. Ironwood resin makes a very hard, durable cement and is used for many purposes for which the beeswax is too malleable.
[237] Ordinarily the beeswax is preferred for the molding of head pieces because the proper shapes can be more easily obtained.

431 Obviously the extension of the kinship personality of a man by the
602 exchange of gifts between far-off relatives or the strengthening of the bonds between near kin such as mari and kutara definitely stimulates economic enterprise. More labor is necessary than if these mechanisms were not present. The goods themselves take on higher value from
[178] their use in the totemic ceremonies; the totemic strings absorb some of the clan ceremonial power and, once used, are taboo to the uninitiated. They are of course valuable in another ritual since they will be used by the receiver for his own totemic emblem and then be passed on to other reciprocating relatives.

4. *Property*

423 Relating Murngin technological articles to human beings by the concept of ownership is one of the methods of controlling and regulating this society's adaptation to the natural environment, since it incorporates the various articles of technology into the general social order. The Murngin concepts of property are developed into a variety of forms according to the type of thing owned. Land is divided among
[614] the clans; and definite areas and their natural objects such as trees, water holes, and the like are considered as belonging to these exogamic
423 units. Derivatively the moieties are also supposed to have an "owning"
616 relationship to the land areas of the country. This means that not only are spatial divisions organized by the separation of all things on the

1: Warner E-5 (1926-1929)1937
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313 Wood is chosen for its degree of hardness and weight and also for its shape according to the purposes of the object to be made. The main forms used are (1) long, slender, light (or heavy) shafts; (2) hollow logs; (3) roots with a well-defined arc; (4) long, straight, slender trunks with thick roots running off at a right angle from the shaft; (5) forked sticks; (6) ends of branches with many twigs and leaves; (7) any variety of dry wood; and (8) very large light wood tree trunks.

314 Three types of bark are used: (1) a long, thick, wide type found on the trunk of the larger eucalyptus; (2) thin paper-like bark from the Melaleuca; and (3) long thin fibers of root bark easily macerated.

Many varieties of leaves are technological material. They are usually [252] gathered in bundles by breaking off branches, but one large-leafed species is used singly as a plate on which to put fresh meat for cooking.

The long reeds of the water-lily ponds, spear grass particularly, and many other varieties of reeds are utilized.

237 The few animal materials used are, from land animals: kangaroo fat, kangaroo gut, kangaroo leg bones, bird feathers, bird bones (particularly leg), opossum fur, opossum gut and human hair; from sea animals: sting-ray prongs, fish and shark vertebrae, bivalve shells, and the melon shell.

Deposits of red ocher and pipe clay are mined along certain portions 317 of the seacoast. Yellow ocher is found in outcroppings. Round river 316 stones about the size of goose eggs are gathered. Diorite stones are also used. Quartzite is quarried from outcroppings. Ordinary earth and sand are used in making houses and ceremonial objects on the ground. Rock 342 ledges forming caves are utilized as shelters during the rainy season. 312 Rock basins which catch rain water are used as types of primitive cisterns to supply water in the absence of wells and fresh-water courses.

3. *General Description of Technical Methods Used in Making Raw Materials into Cultural Artifacts*

000 Only the general methods by which raw material is formed into artifacts will be discussed here. Each specific technique will be described in the section dealing with the articles manufactured.

412 The chief tools used with food are the ground stone axe,[4] a knife (formerly made of bone, but, since the Malay contacts, of iron), and a variety of bivalve shell.

322 Cylindrical wooden articles are made by cutting down a tree or

[4] The iron tomahawk is now used in its place.

1: Warner E-5 (1926-1929) 1937
OI 17 Murngin OI 17

limb of the right size, hacking and pulling off the outer and inner bark with the axe and fingers, and then scraping the wood to the proper size with the axe and unhafted bivalve shell. 322

Flat wooden artifacts are formed by first splitting the cylinder in half and then splitting off a segment from the flat inner surface. Axe and shell are then used to hew the wood into the proper shape.

Hollow cylindrical objects are made by cutting down a tree eaten out by white ants, stripping outer and inner bark from it, and then cutting and scraping it with axe and shell to the form desired.

Bark Technique.—To remove thick bark from the trunk of a tree, a cut is made around the bottom of the tree, and another just below the forks of the tree. A split is then made with the axe down the side of the tree from top to the bottom and the bark pulled from the trunk. The outer bark is then stripped off. Processes vary from here on according to the artifact to be manufactured. The bark may be soaked in water or heated to bend it to the shape desired; sometimes, as in house building, only pressure is applied to it. 314

Paper bark (Melaleuca), the thin white bark of the ti tree found in Arnhem Land in the swamps and where the ground is moist the year round, is used in a number of ways. It is usually removed from the tree by taking the handle end of the spear-thrower and inserting it until it hits the trunk of the tree, then pulling down upon it in the same way that a knife would be used. Along the seacoast this bark does not enter so much into the culture as in the more distant interior, since sea shells offer better material for containers, largely because they are more easily prepared for use than the vegetable material.

Paper bark is used for water and honey containers, as a ladle for dipping water from the well, for pubic covering, mats, "blankets," cigarette paper, exterior covering for houses, tinder material for starting fire, the core of many totemic emblems, the "dunce cap" of the Gunabibi ceremony, and for many other daily uses.

Stone Technique.—The Murngin go to the interior for their spear heads and stone knives, or obtain them in trade. The techniques used are the same as those described in Spencer and Gillen's *Aruntа*:[8] 324

Cements.—The Murngin have four varieties of adhesives. Ironwood resin is the principal cement used. The roots of the ironwood tree are cut into strips a few feet in length and heated over a fire. The sap is scraped from the sticks and collected on a central wooden core where it cools and hardens. When wanted for use it is heated again in a 314

[8] Spencer and Gillen, *The Arunta*, Macmillan, London, 1927, pp. 540-548.

1: Warner E-5 (1926-1929)1937
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small fire. It is used to haft wooden spear heads to their shafts, to articulate the peg of the spear-thrower to the shaft, and also to haft the feathers of some of the larger headdresses to a wooden or bone shaft.

Beeswax is used to join the stone spear head to the shaft, it serves as the core for the various feather headdresses, it is used to make the mouth of the wooden trumpet small enough to fit the lips, and at times it is used as calking material for boats. It is also pushed into the hole always made in the septum to give the nose, for purely aesthetic reasons, a very concave form. (If beeswax is not used, small rings are made by wrapping two ends of cane together with fiber string and inserting them in the hole made in the septum.) When not in use, beeswax is molded into a flat mass and carried in a man's basket.

Human blood or the sap of an orchid bulb (djelkork) is used to glue feathers and paint to the dancers' bodies for the various ceremonies, and to stick these same materials on their totemic emblems. When the bulb is used, it is chewed and the macerated end rubbed on the object to be decorated.

Hafting.—Wooden objects to be hafted together are always carved to fit nicely. Ironwood resin or beeswax is heated and applied to the parts, which are then fitted together and wrapped with fiber string.

III. Murngin Artifacts

In the last few pages we have briefly described the Murngin in relation to their natural environment, the kinds of materials they select from the environment, and the more general techniques used in fashioning their tools. In Appendix II, pages 471-505, we shall describe the various articles of the technology and their manufacture.

Murngin technology is forever subject to two fundamental changes: first, the constant movements from food ground to food ground, and, secondly and more radically, the exigencies of the alternate rainy and more favorable dry seasons. Both are essentially problems of environmental adaptation: the one involves the adjustment of man to his food supply rather than vice versa through an agricultural or pastoral economy; and the other is an adjustment to a semi-annual seasonal change which can best be stated in terms of fifty to sixty inches of rain during three or four months and none at all during the rest of the year. These adjustments have profoundly and fundamentally affected Murngin technology and, as we shall see later, their ritual and myth.

3: Mountford E-5 (1948) 1956 O117 Murngin O17

(iv) SHEETS OF BARK

The bark sheets were stripped from one of the local stringy-barks (*Eucalyptus tetradonta*). After having selected a tree of a size suitable for his purpose, and one free from knots and cracks, the aboriginal first made two cuts round the circumference of the tree, usually about three feet apart, then, loosening a strip of bark at the lower cut, pulled it upward, leaving a narrow vertical opening. Into this opening the native inserted the point of a sharpened stick, and gently levered the bark from the tree. The whole operation usually occupied about three minutes. The aboriginal then threw the bark, rough outer surface downward, on a large fire for a short time, after which he stripped off the outer fibrous bark until the inner denser portion was about three-sixteenths of an inch thick. In this condition the bark, being particularly flexible, was easily flattened by levelling a patch of sand, placing the bark on top, covering it with more sand, and leaving it until dry. The drying took several days to a fortnight, depending on the humidity of the atmosphere. Normally, these bark sheets were used for building the wet-weather shelters (Pl. 3A) on the inside of which the aborigines spent much of their spare time painting pictures.[47]

The method which I adopted was to ask the men to make bark paintings for me, seldom suggesting a subject. At the end of the day, the artists brought their work to my tent, related the associated myth, and explained the meanings of the designs. Under normal tribal conditions, most of the bark paintings are the result of idle hours, when the artist depicts subjects in which he is most interested. But this is not always so. In the Milingimbi and Oenpelli areas, the old men paint designs on sheets of bark which illustrate secret totemic myths. These are exhibited to the novitiates during their initiation and age-grading ceremonies.[48]

5. THE ARTISTS

Some writers suggest that only a limited number of aboriginal men are employed as artists.[49] This is not so. All men were willing to and could paint, although, naturally, some are more skilled than others. The men shown on Pl. 4 produced bark paintings that belonged to Groote Eylandt, Yirrkalla, Oenpelli and Liverpool River areas respectively.

Pl. 4B is *Nangapiana* from Groote Eylandt, who with his relatives, *Tatalura* and *Juliaura*, produced many fine bark paintings. Pl. 21E and Pl. 25B are the work of *Nangapiana*. *Mini-mini*, mentioned by Adam,[50] also made a number of paintings. He did not, however, employ the fine brushwork of *Nangapiana*, although the results were attractive and colourful. Pl. 30C is *Mini-mini's* work.

47. As the supply of prepared sheets of bark at Yirrkalla and Oenpelli became exhausted, I provided the artists with sheets of rough-surfaced dark grey and green paper. The paintings on these sheets of paper can be distinguished in the illustrations by the smooth ground.
48. Warner (1937), p. 316; also p. 224.
49. Adam (1951), p. 103.
50. Adam (1951), p. 104.

3: Mountford E-5 (1948) 1956 QH17 Murngin QH17

dulwar. This is the totemic place of the mythical man *Balonaruti* and the paper-bark trees.

During the early days of the world *Balonaruti* invented the method of preparing *nutu* from the fruit of the cycad[6] so that it would be fit for human consumption. *Balonaruti* first broke the shells, pounded the kernels into flour, placed the flour in a finely-woven basket and soaked the food for three days in running water to remove the poison. At the end of that time he stripped sheets of paper-bark[7] from the adjacent trees and taking the soaked flour from the water, wrapped it in the paper-bark and allowed it to drain for several hours. After this treatment the flour was ready to eat. *Balonaruti*'s invention, still in use, ensures a plentiful food supply for the aborigines. The place where the mythical man prepared the cycad flour, *nutu*, is now a swamp filled with large paper-bark trees, some of them still bearing the marks where *Balonaruti* stripped the bark from them.

Two bark paintings, although somewhat similar in design, illustrate different aspects of the same myth.

On Pl. 98C,[8] the transverse bands *a* and *b* are sand-banks on the River Caimmani, and *c* the main track between the north and the south of Caledon Bay. The lozenges are the paper-bark trees in the swamp, and the dots on the ends of the lozenges, fine white dust in the bark which the wild bees collect and carry to their hives. The cross-hatching indicates the pieces of bark lying about the base of the tree after the stripping is finished.

Plate 98B represents an individual tree at Matamataui. The lozenges on the upper and lower panels indicate places on the trunk from which *Balonaruti* had stripped the bark, and the dots, like those on the previous painting, the white dust which the bees take to their hives. The cross-hatched bands surrounding the two panels indicate the upper part of the tree which the mythical man, being unable to reach, could not strip of its bark.

The Man, Rualko, and the Turtle, Murutu-murutu, at Cape Shield

The *jiritja* man *Rualko* lived, during mythical times, on the beach at Cape Shield. He ate only the eggs of turtles and sea-birds.

On Pl. 98D the central panel is the track of the female turtle, *murutu-murutu*, the herring-bone design being the marks she made in the sand as she crawled from the water to lay her eggs. The inner oval at *b* is the sand disturbed by the turtle in the preparation of her nest, and the dots in the outer oval her eggs. On his way to the turtle nest (see footmarks, panel *c*), *Rualko* collected the eggs (dots in panel *c*) which the four black seagulls had laid on the path. His returning footmarks are shown in panel *d*. The horizontal groups of wavy lines *e*, *e*, *e*, are the marks made in the sand by the sand-crabs, *gunjun*, and the semicircles

6. This fruit is poisonous if eaten in its raw state.
7. Paper-bark, being particularly soft and flexible, is used for a wide variety of purposes.
8. Interpretation by F. D. McCarthy.

5: Webb M-5 (ca. 1930) 1934
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The soft bark of the giant tea-tree, commonly called paper-bark, is utilised for such purposes as the bandaging of wounds, the protection of spear points, the covering of huts, the carrying of babies, the parcelling of food, and the making of receptacles in which water is carried. 314

Fire is produced by wooden drills. The end of the drill is placed in a notch cut in a piece of soft-wood, which is held on the ground by the foot, and the drill is then spun between the palms of the hands. I have seen fire produced by this means in as short a time as 35 seconds. 372

Large dug-out canoes are made from the trunks of trees of several species, and in these canoes long voyages are made across the open sea. 501

The only musical instruments used, if they may be so termed, are the "Yiraki," or drone-pipe, and the "Bilma," or clap-sticks. The Yiraki is about four feet in length, and is constructed of a piece of wood about three inches in diameter which has been hollowed by termites. At the smaller end a mouthpiece is formed of beeswax. This instrument supplies a droning accompaniment during the singing of chants. No tune upon it is possible, its range being limited to three notes of the scale, which are produced by a variation of the wind pressure. 534

The Bilma are simply two pieces of hardwood, oval in section, and about one foot in length, which, being struck together, supply the "time" for chants and dances.

Sometimes two boomerangs are held in the one hand, separated by one or more fingers, and by a quick movement of the wrist are made to produce a rhythmic rattling.

In the manufacture of these various weapons and utensils a high degree of constructive skill and neatness of workmanship is evidenced. Practically all these articles are richly ornamented, and probably nowhere in Australia has aboriginal decorative art reached a finer development than in East Arnhem Land. 531

222 484 Even when they are making for a definite camping ground, aborigines very rarely travel in a straight line. Instead, the journey is made slowly, with deviations to favoured localities which are likely to yield food or game, so that they can hunt as they go. The women and children search for vegetable food as they travel, pausing at intervals to dig yams or other roots, which are put in a "dilly bag" or basket (*bäti*) carried for the purpose. Meanwhile the men are on the lookout for sugar bag (wild honey), opossums, bandicoots (*Isoodon*), native cats (*Dasyurus*), as well as snakes and goannas (*Varanus*) or any other game which they can find. On these journeys nothing comes amiss, and in addition to the quest for food, both men and women pause to gather any materials of use in technological [314] processes, which they may see. The young branches of such [283] trees as *bulgut*, (*Brachychiton paradoxum*), which form an important source of the fibre used for making string, are cut, the bast fibre stripped and tied neatly or rolled up, to be put into their dilly bags for later use. When a "sugar bag" or wild bees' nest is found the honey and even the bee bread is eaten on the spot, unless there is a large [415] amount, when it is carried in a bark trough or a closely [237] woven basket of special type called *timbuka*. The soft black wax is roughly moulded into a ball and carried in this form, to be cleaned and refined later, and used for the mounting of certain spear heads, particularly for *ŋämbi* and *kaiyit* (flint and iron respectively).

[221] 222 512 When the vegetable harvest is at its height, about the middle of the south-east season, and the people are living chiefly on a single staple food which can be harvested readily in one place, the women generally go out in a body. [476] But at such times, although they work close together, there IS NO POOLING OF RESOURCES; EACH COLLECTS 30 FOOD INDEPENDENTLY, WORKING FOR HER OWN FAMILY OR FAMILY GROUP.

9: Thomson E-5 (1935-1943)1949
OI17 Murngin OI17

is no pooling of resources; each collects food independently, working for her own family or family group. And again, as they travel, the women gather any materials they chance to find which may be of use later, in technology. In this way the people accumulate a reserve of string, fibre, (in various stages of manufacture), resin, bone for making of yam knives and awls, for domestic use, or for canoe and bark trough manufacture, and all the materials regularly used in technology. These are carried in the *bäti*, generally in the form of neat parcels wrapped in *bärrukülla* (*Melaleuca* bark). When the men make a chance visit to an area famed for its spear woods, pigments, or other special material, they gather this and carry it in reserve, for later gift or exchange purposes. Similarly, feathers or down (*rämmän*) of birds are collected, and *bulnyin*, the fur of the Brush-tailed Possum, which is valued also for ceremonial purposes, is stripped before the animal is cooked. The spines (*dimir*) of stingrays are also extracted and all materials useful for technological and ceremonial purposes are removed while an animal is being prepared, wrapped in neat parcels in paperbark and placed in the dilly bag until required for use. As this material is generally carried by the natives in their baskets when they are hunting, they are able to make use of any moments of leisure during a halt, or while food is being cooked, to repair and maintain implements and utensils.

Certain materials, particularly the fat of *kärritjämbäl* the Red Kangaroo, and of a few other animals, and the fat and feathers of some birds, chief of which are the Emu, Plain Turkey or Bustard, the Jabiru and Native Companion, which are difficult to approach, have a high "social value" and are greatly prized. These materials have a ritual sig-

[396] voyages in the open sea, the matter is different. These craft
501 are hollowed out of a single tree. They have no keels, but are quite smooth underneath, and today are built without outriggers (although these are said to have been used by the Macassars), and depend for their safety and stability as much on the skill employed in their manufacture as in
[435] the seamanship of their crews. These *lippa lippa* are unlike any other element of material culture and are valued greatly.
173 The natives say that in former times the Macassar voyagers
439 brought these craft to Arnhem Land each season in their
648 praus and that a prau carried as many as eight or ten *lippa*
501 *lippa*. When the time came for their departure, the Macassar men presented the canoes to the natives as part of their farewell payment, and this became a ceremonial occasion.

177 Before the coming of the Indonesian voyagers the natives
501 used only bark canoes,[20] called *bärwän*, and swimming logs,
[396] and it was only after the introduction by the Macassars of the *lippa lippa*, together with iron tools for cutting it, that the Arnhem Land people began making wooden canoes for themselves. Much labour is involved in the cutting of a big canoe, and none of the tools formerly used by the natives of Arnhem Land would have been fitted for
[412] this work. Although they possessed stone axes and shell scrapers, they lacked such tools as the fine, strong, relatively efficient adzes made from shell such as were used by the sea-faring peoples of Cape York Peninsula. This fact, and the way in which the wooden canoe was introduced, as well as its association with the Macassar voyagers, has given the *lippa lippa* a special place in Arnhem Land culture. But

[314] [20] The bark used is that of *Eucalyptus tetrodonta*, one of the "stringybarks", which is much used in technology. In addition to the manufacture of canoes, it serves for the roofing of houses and for the manufacture of certain vessels used for carrying water, as well as in the preparation of food.